Docket No.: 0690-0123PUS1
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Peter OAKLEY et al.

Application No.: 10/534,637 Confirmation No.: 1067

Filed: May 12, 2005 Art Unit: 4133

For: METHOD FOR YIELD IMPROVEMENT IN GLYPHOSATE-RESISTENT LEGUMES Examiner: A. M. Holt

LETTER SUBMITTING ENGLISH TRANSLATION OF PRIORITY APPLICATION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This priority application DE 10252881.0 was filed in a language other than English. Applicant submits herewith an English translation and Verification of Translation of the above-identified Priority Application DE 10252881.0 filed on November 12, 2002.

Dated: May 2, 2008

Respectfully submitted,

By _____
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Attachment(s)

UNITED STATES PATENT AND TRADEMARK OFFICE

I, Charles Edward SITCH BA,

Managing Director of RWS Group Ltd UK Translation Division, of Europa House, Marsham Way, Gerrards Cross, Buckinghamshire, England declare;

1. That I am a citizen of the United Kingdom of Great Britain and Northern Ireland.

2. That the translator responsible for the attached translation is well acquainted with the German and English languages.

3. That the attached is, to the best of RWS Group Ltd knowledge and belief, a true translation into the English language of the accompanying copy of the specification filed with the application for a patent in the United States of America on 12 November 2002 under the number 10/534,637 and the official certificate attached thereto.

4. That I believe that all statements made herein of my own knowledge are true and that all statements made on information and belief are true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the patent application in the United States of America or any patent issuing thereon.

For and on behalf of RWS Group Ltd

The 14th day of January 2008

We claim:

1. A method for increasing the yield in glyphosate-resistant legumes, which comprises treating the plants or the seed with a mixture comprising

a) a compound of the formula I

I

in which

X is halogen, C_1-C_4-alkyl or trifluoromethyl,

m is 0 or 1,

Q is $C(=CH-CH_3)-COOCH_3$, $C(=CH-OCH_3)-COOCH_3$, $C(=N-OCH_3)-CONHCH_3$, $C(=N-OCH_3)-COOCH_3$ or $N(-OCH_3)-COOCH_3$,

A is $-O-B$, $-CH_2O-B$, $-OCH_2-B$, $-CH=CH-B$, $-C\equiv C-B$, $-CH_2O-N=C(R^1)-B$ or $-CH_2O-N=C(R^1)-C(R^2)=N-OR^3$, where

B is phenyl, naphthyl, 5-membered or 6-membered hetaryl or 5-membered or 6-membered heterocyclyl, comprising one to three N atoms and/or one O or S atom or one or two O and/or S atoms, the ring systems being unsubstituted or substituted by one to three radicals R^a:

R^a being cyano, nitro, amino, aminocarbonyl, aminothiocarbonyl, halogen, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylcarbonyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkyloxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl,

C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, phenyl, phenoxy, benzyl, benzyloxy, 5- or 6-membered heterocyclyl, 5- or 6-membered hetaryl, 5- or 6-membered hetaryloxy, C(=NOR')-OR" or OC(R')$_2$-C(R")=NOR",
the cyclic radicals, in turn, being unsubstituted or substituted by one to three radicals R^b:

R^b being cyano, nitro, halogen, amino, aminocarbonyl, aminothiocarbonyl, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, phenyl, phenoxy, phenylthio, benzyl, benzyloxy, 5- or 6-membered heterocyclyl, 5- or 6-membered hetaryl, 5- or 6-membered hetaryloxy or C(=NOR')-OR",

R' is hydrogen, cyano, C_1-C_6-alkyl, C_3-C_6-cycloalkyl or C_1-C_4-haloalkyl,

R" is hydrogen, C_1-C_6-alkyl, C_3-C_6-alkenyl, C_3-C_6-alkynyl, C_1-C_4-haloalkyl, C_3-C_6-haloalkenyl or C_3-C_6-haloalkynyl,

R^1 is hydrogen, cyano, C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_3-C_6-cycloalkyl or C_1-C_4-alkoxy,

R^2 is phenyl, phenylcarbonyl, phenylsulfonyl, 5- or 6-membered hetaryl, 5- or 6-membered hetarylcarbonyl or 5- or 6-membered hetarylsulfonyl, the ring systems being unsubstituted or substituted by one to three

radicals R^a,

C_1-C_{10}-alkyl, C_3-C_6-cycloalkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_{10}-alkylcarbonyl, C_2-C_{10}-alkenylcarbonyl, C_3-C_{10}-alkynylcarbonyl, C_1-C_{10}-alkylsulfonyl or C(R')=NOR", the hydrocarbon radicals of these groups being unsubstituted or substituted by one to three radicals R^c:

R^c being cyano, nitro, amino, aminocarbonyl, aminothiocarbonyl, halogen, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy,

C_3-C_6-cycloalkyl, C_3-C_6-cycloalkyloxy, 5- or 6-membered heterocyclyl, 5- or 6-membered heterocyclyloxy, benzyl, benzyloxy, phenyl, phenoxy, phenylthio, 5- or 6-membered hetaryl, 5- or 6-membered hetaryloxy and hetarylthio, it being possible for the cyclic groups, in turn, to be partially or fully halogenated or to have attached to them one to three radicals R^a, and

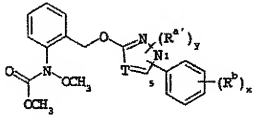
R^3 is hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl or C_2-C_6-alkynyl, the hydrocarbon radicals of these groups being unsubstituted or substituted by one to three radicals R^c,

and

b) a glyphosate derivative II

in a synergistically active amount.

2. The method as claimed in claim 1, wherein an active ingredient of the formula Ia



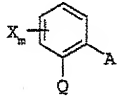
Ia

in which T is CH or N and $R^{a'}$ and R^b are halogen or C_1-C_4-alkyl, the phenyl group is in the 1- or 5-position and x is 0, 1 or 2 and y is 0 or 1

is used as component a).

3. A mixture comprising

a) a compound of the formula I



I

in which

X is halogen, C_1-C_4-alkyl or trifluoromethyl,

m is 0 or 1,

Q is $C(=CH-CH_3)-COOCH_3$, $C(=CH-OCH_3)-COOCH_3$, $C(=N-OCH_3)-CONHCH_3$, $C(=N-OCH_3)-COOCH_3$ or $N(-OCH_3)-COOCH_3$,

A is -O-B, $-CH_2O-B$, $-OCH_2-B$, -CH=CH-B, -C□C-B, $-CH_2O-N=C(R^1)-B$ or $-CH_2O-N=C(R^1)-C(R^2)=N-OR^3$, where

B is phenyl, naphthyl, 5-membered or 6-membered hetaryl or 5-membered or 6-membered heterocyclyl, comprising one to three N atoms and/or one O or S atom or one or two O and/or S atoms, the ring systems being unsubstituted or substituted by one to three radicals R^a:

R^a being cyano, nitro, amino, aminocarbonyl, aminothiocarbonyl, halogen, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylcarbonyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkyloxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, phenyl, phenoxy, benzyl, benzyloxy, 5- or 6-membered heterocyclyl, 5- or 6-membered hetaryl, 5- or 6-membered hetaryloxy, C(=NOR')-OR" or OC(R')$_2$-C(R")=NOR",
the cyclic radicals, in turn, being unsubstituted or substituted by one to three radicals R^b:

R^b being cyano, nitro, halogen, amino, aminocarbonyl, aminothiocarbonyl, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, phenyl, phenoxy, phenylthio, benzyl, benzyloxy, 5- or 6-membered heterocyclyl, 5- or 6-membered hetaryl, 5- or 6-membered hetaryloxy or C(=NOR')-OR",

R' is hydrogen, cyano, C_1-C_6-alkyl, C_3-C_6-cycloalkyl or C_1-C_4-haloalkyl,

R" is hydrogen, C_1-C_6-alkyl, C_3-C_6-alkenyl, C_3-C_6-alkynyl, C_1-C_4-haloalkyl, C_3-C_6-haloalkenyl or C_3-C_6-haloalkynyl,

R^1 is hydrogen, cyano, C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_3-C_6-cycloalkyl or C_1-C_4-alkoxy,

R^2 is phenyl, phenylcarbonyl, phenylsulfonyl, 5- or 6-membered hetaryl, 5- or 6-membered hetarylcarbonyl or 5- or 6-membered hetarylsulfonyl, the ring systems being unsubstituted or substituted by one to three radicals R^a,

C_1-C_{10}-alkyl, C_3-C_6-cycloalkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_{10}-alkylcarbonyl, C_2-C_{10}-alkenylcarbonyl, C_3-C_{10}-alkynylcarbonyl, C_1-C_{10}-alkylsulfonyl or C(R')=NOR", the hydrocarbon radicals of these groups being unsubstituted or substituted by one to three radicals R^c:

R^c being cyano, nitro, amino, aminocarbonyl, aminothiocarbonyl, halogen, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy,

C_3-C_6-cycloalkyl, C_3-C_6-cycloalkyloxy, 5- or 6-membered heterocyclyl, 5- or 6-membered heterocyclyloxy, benzyl, benzyloxy, phenyl, phenoxy, phenylthio, 5- or 6-membered hetaryl, 5- or 6-membered hetaryloxy and hetarylthio, it being possible for the cyclic groups, in turn, to be partially or fully halogenated or to have attached to them one to three radicals R^a, and

R^3 is hydrogen,
C_1-C_6-alkyl, C_2-C_6-alkenyl or C_2-C_6-alkynyl, the hydrocarbon radicals of these groups being unsubstituted or substituted by one to three radicals R^c,

and
b) a glyphosate derivative II

in such an amount that the yield is increased synergistically.

Method for increasing the yield in legumes

Description

The present invention relates to a method for increasing the yield in glyphosate-resistant legumes, which comprises treating the plants or the seed with a mixture comprising

a) a compound of the formula I

I

in which

X is halogen, C_1-C_4-alkyl or trifluoromethyl,

m is 0 or 1,

Q is C(=CH-CH_3)-$COOCH_3$, C(=CH-OCH_3)-$COOCH_3$, C(=N-OCH_3)-$CONHCH_3$, C(=N-OCH_3)-$COOCH_3$ or N(-OCH_3)-$COOCH_3$,

A is -O-B, -CH_2O-B, -OCH_2-B, -CH=CH-B, -C≡C-B, -CH_2O-N=C(R^1)-B or -CH_2O-N=C(R^1)-C(R^2)=N-OR^3, where

B is phenyl, naphthyl, 5-membered or 6-membered hetaryl or 5-membered or 6-membered heterocyclyl, comprising one to three N atoms and/or one O or S atom or one or two O and/or S atoms, the ring systems being unsubstituted or substituted by one to three radicals R^a:

R^a being cyano, nitro, amino, aminocarbonyl, aminothiocarbonyl, halogen, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylcarbonyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkyloxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, phenyl, phenoxy, benzyl, benzyloxy, 5- or 6-membered heterocyclyl, 5- or 6-membered

hetaryl, 5- or 6-membered hetaryloxy, C(=NOR')-OR" or $OC(R')_2$-C(R")=NOR"
the cyclic radicals, in turn, being unsubstituted or substituted by one to three radicals R^b:

R^b being cyano, nitro, halogen, amino, aminocarbonyl, aminothiocarbonyl, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, phenyl, phenoxy, phenylthio, benzyl, benzyloxy, 5- or 6-membered heterocyclyl, 5- or 6-membered hetaryl, 5- or 6-membered hetaryloxy or C(=NOR')-OR",

R' is hydrogen, cyano, C_1-C_6-alkyl, C_3-C_6-cycloalkyl or C_1-C_4-haloalkyl,

R" is hydrogen, C_1-C_6-alkyl, C_3-C_6-alkenyl, C_3-C_6-alkynyl, C_1-C_4-haloalkyl, C_3-C_6-haloalkenyl or C_3-C_6-haloalkynyl,

R^1 is hydrogen, cyano, C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_3-C_6-cycloalkyl or C_1-C_4-alkoxy,

R^2 is phenyl, phenylcarbonyl, phenylsulfonyl, 5- or 6-membered hetaryl, 5- or 6-membered hetarylcarbonyl or 5- or 6-membered hetarylsulfonyl, the ring systems being unsubstituted or substituted by one to three radicals R^a,

C_1-C_{10}-alkyl, C_3-C_6-cycloalkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_{10}-alkylcarbonyl, C_2-C_{10}-alkenylcarbonyl, C_3-C_{10}-alkynylcarbonyl, C_1-C_{10}-alkylsulfonyl or C(R')=NOR", the hydrocarbon radicals of these groups being unsubstituted or substituted by one to three radicals R^c:

R^c being cyano, nitro, amino, aminocarbonyl, aminothiocarbonyl, halogen, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-

C_5-alkoxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy,

C_3-C_6-cycloalkyl, C_3-C_6-cycloalkyloxy, 5- or 6-membered heterocyclyl, 5- or 6-membered heterocyclyloxy, benzyl, benzyloxy, phenyl, phenoxy, phenylthio, 5- or 6-membered hetaryl, 5- or 6-membered hetaryloxy and hetarylthio, it being possible for the cyclic groups, in turn, to be partially or fully halogenated or to have attached to them one to three radicals R^a, and

R^3 is hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl or C_2-C_6-alkynyl, the hydrocarbon radicals of these groups being unsubstituted or substituted by one to three radicals R^c,

and
b) a glyphosate derivative
in a synergistically active amount.

It is already known from the literature that active ingredients of the formula I, which are generally referred to as strobilurins, are capable of bringing about increased yields in crop plants in addition to their fungicidal action (Koehle H. et al. in *Gesunde Pflanzen* **49** (1997), pages 267-271; Glaab J. et al. *Planta* **207** (1999), 442-448).

Furthermore, it is known from WO-A 97/36488 that the application of glyphosate derivatives in glyphosate-tolerant plants selected from the group consisting of sugar beet, fodder beet, maize, oilseed rape and cotton may bring about increased yields. Furthermore, it is known from US-A 3 988 142 that the sublethal application of glyphosate in plants such as sugar cane increases starch and sugar production and thus the overall yield of the plant.

Surprisingly, it has now been found that the application of glyphosate and strobilurins such as, in particular, pyraclostrobin results in a synergistic effect in legumes. This means that the purely additive (in mathematical terms)

yield-increasing effect of strobilurin and of the glyphosate derivative is surpassed by application of the mixture according to the invention. This synergistic effect is more than surprising, since normally it can be assumed that a fungicide and herbicide have completely different mechanisms of action.

Accordingly, the method defined at the outset has been found. The active ingredients of the formula I which are used are known as fungicides and in some cases also as insecticides (EP-A 253 213; WO-A 95/18789; WO-A 95/24396; WO-A 96/01256; WO-A 97/15552). However, there has been no suggestion to date that these active ingredients in combination with glyphosate derivatives might possibly bring about an increased yield in legumes.

The good tolerance of the active ingredients of the formula I by plants, at the concentrations required for controlling plant diseases, permits the treatment of aerial plant parts and also of plants in the seedling stage and of seed.

In the method according to the invention, the active ingredient is preferably taken up by the plant via the roots and distributed throughout the entire plant in the plant sap.

In a preferred embodiment of the method, the subterraneous plant parts are treated with a formulation of the active ingredient I, and the glyphosate is applied above-ground either simultaneously or at a later point in time.

In a preferred embodiment of the method, the above-ground plant parts of genetically modified legumes are treated with a mixture according to the invention comprising a) a strobilurin derivative I and b) a glyphosate derivative. The application of glyphosate reduces the competition of the crop plant and the weed plants for nutrients and light and thus increases the yield of the crop plant. The mixture according to the invention is especially preferably applied to the above-ground part of the plant or at the seedling stage of the plant.

Methods for generating plants which are resistant to the effect of glyphosate are described in the more recent literature (EP-A 218 571, EP-A 293 358, WO-A 92/00377 and

WO-A 92/04449). Chemical Abstracts, 123, No.21 (1995) A.N. 281158c describes the generation of glyphosate-resistant soybean plants. Other glyphosate-resistant legumes can be generated in a similar manner. Methods for the transformation of legumes are known in the literature and can be used - as outlined further above - for generating, for example, glyphosate-resistant beans, peas, lentils, peanuts and lupins: *Plant Science* (*Shannon*) 150(1) Jan.14, 2000, 41-49; *J. of Plant Biochemistry & Biotechnology* 9(2) July, 2000, 107-110; *Acta Physiologiae Plantarum* 22(2), 2000, 111-119; *Molecular Breeding* 5(1) 1999, 43-51; *In Vitro Cellular & Developmental Biology, Animal* 34 (3 Part 2) March, 1998, 53A; *Plant Cell Reports* 16(8), 1997, 513-519 and 541-544; *Theoretical & Applied Genetics* 94(2), 1997, 151-158; *Plant Science*, 117 (1-2), 1996, 131-138; *Plant Cell Reports* 16(1-2), 1996, 32-37.

The preparation of the active ingredients used in the method according to the invention is known from the literature cited at the outset.

Active ingredients with the following meanings of the substituents, in each case on their own or in combination, are especially preferred for the method according to the invention:

Especially preferred active ingredients for the method according to the invention are, in particular, those of the formulae II to VIII in which
V is OCH_3 or $NHCH_3$ and Y is CH or N.

Preferred active ingredients of the formula I in which Q is $C(=N-OCH_3)-COOCH_3$ are the compounds described in the publications EP-A 253 213 and EP-A 254 426.

Preferred active ingredients of the formula I in which Q is $C(=N-OCH_3)-CONHCH_3$ are the compounds described in the publications EP-A 398 692, EP-A 477 631 and EP-A 628 540.

Preferred active ingredients of the formula I in which Q is $N(-OCH_3)-COOCH_3$ are the compounds described in the publications WO-A 93/15046 and WO-A 96/01256.

Preferred active ingredients of the formula I in which Q is $C(=CH-OCH_3)-COOCH_3$ are the compounds described in the

publications EP-A 178 826 and EP-A 278 595.

Preferred active ingredients of the formula I in which Q is $C(=CH-CH_3)-COOCH_3$ are the compounds described in the publications EP-A 280 185 and EP-A 350 691.

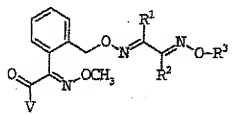
Preferred active ingredients of the formula I in which A is $-CH_2O-N=C(R^1)-B$ are the compounds described in the publications EP-A 460 575 and EP-A 463 488.

Preferred active ingredients of the formula I in which A is -O-B are the compounds described in the publications EP-A 382 375 and EP-A 398 692.

Preferred active ingredients of the formula I in which A is $-CH_2O-N=C(R^1)-C(R^2)=N-OR^3$ are the compounds described in the publications WO-A 95/18789, WO-A 95/21153, WO-A 95/21154, WO-A 97/05103, WO-A 97/06133 and WO-A 97/15552.

Especially preferred are active ingredients of the formula I in which
Q is $C(=N-OCH_3)-COOCH_3$ or $C(=N-OCH_3)-CONHCH_3$,
A is CH_2-O- and
B is $-N=C(R^1)-C(R^2)=N-OR^3$, where
R^1 is hydrogen, cyano, cyclopropyl, C_1-C_4-alkyl or C_1-C_2-haloalkyl, in particular methyl, ethyl, 1-methylethyl or trifluoromethyl, and
R^2 is C_1-C_4-alkyl, C_2-C_5-alkenyl, phenyl which is substituted by one or two halogen atoms, or is $C(R')=NOR''$, where
R' is one of the groups mentioned above under R^1 and
R'' is hydrogen, cyclopropyl or C_1-C_4-alkyl, in particular methyl, ethyl or isopropyl, and
R^3 is one of the groups mentioned under R'';

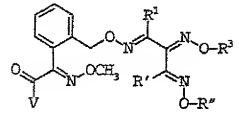
these active ingredients are described by the formula II



II

in which the variables have the abovementioned meanings.

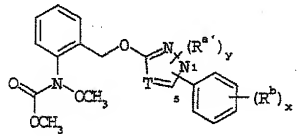
Active ingredients of the formula IIA



IIA

in which the variables have the abovementioned meanings are particularly preferred.

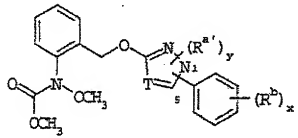
In addition, other compounds which are especially preferred are those of the formula Ia where T is CH or N and $R^{a'}$ and R^b are halogen or C_1-C_4-alkyl and x is 0, 1 or 2 and y is 0 or 1.



Ia

The active ingredients compiled in the tables which follow are especially preferred with regard to their use as safeners.

Table I

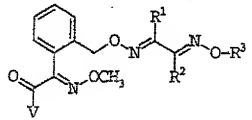


Ia

No.	T	$(R^{a'})_y$	Position of the group phenyl-$(R^b)_x$	$(R^b)_x$	Reference
Ia-1	N	-	1	2,4-Cl_2	WO-A 96/01256
Ia-2	N	-	1	4-Cl	WO-A 96/01256

Ia-3	CH	-	1	2-Cl	WO-A 96/01256
Ia-4	CH	-	1	3-Cl	WO-A 96/01256
Ia-5	CH	-	1	4-Cl	WO-A 96/01256
Ia-6	CH	-	1	4-CH_3	WO-A 96/01256
Ia-7	CH	-	1	H	WO-A 96/01256
Ia-8	CH	-	1	3-CH_3	WO-A 96/01256
Ia-9	CH	5-CH_3	1	3-CF_3	WO-A 96/01256
Ia-10	CH	1-CH_3	5	3-CF_3	WO-A 99/33812
Ia-11	CH	1-CH_3	5	4-Cl	WO-A 99/33812
Ia-12	CH	1-CH_3	5	-	WO-A 99/33812

Table II



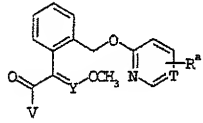
II

No.	V	R^1	R^2	R^3	Reference
II-1	OCH_3	CH_3	CH_3	CH_3	WO-A 95/18789
II-2	OCH_3	CH_3	$CH(CH_3)_2$	CH_3	WO-A 95/18789
II-3	OCH_3	CH_3	CH_2CH_3	CH_3	WO-A 95/18789
II-4	$NHCH_3$	CH_3	CH_3	CH_3	WO-A 95/18789
II-5	$NHCH_3$	CH_3	4-F-C_6H_4	CH_3	WO-A 95/18789
II-6	$NHCH_3$	CH_3	4-Cl-C_6H_4	CH_3	WO-A 95/18789

II-7	$NHCH_3$	CH_3	$2,4\text{-}C_6H_3$	CH_3	WO-A 95/18789
II-8	$NHCH_3$	Cl	$4\text{-}F\text{-}C_6H_4$	CH_3	WO-A 98/38857
II-9	$NHCH_3$	Cl	$4\text{-}Cl\text{-}C_6H_4$	CH_2CH_3	WO-A 98/38857
II-10	$NHCH_3$	CH_3	$CH_2C(=CH_2)CH_3$	CH_3	WO-A 97/05103
II-11	$NHCH_3$	CH_3	$CH=C(CH_3)_2$	CH_3	WO-A 97/05103
II-12	$NHCH_3$	CH_3	$CH=C(CH_3)_2$	CH_2CH_3	WO-A 97/05103
II-13	$NHCH_3$	CH_3	$CH=C(CH_3)CH_2CH_3$	CH_3	WO-A 97/05103
II-14	$NHCH_3$	CH_3	$O\text{-}CH(CH_3)_2$	CH_3	WO-A 97/06133
II-15	$NHCH_3$	CH_3	$O\text{-}CH_2CH(CH_3)_2$	CH_3	WO-A 97/06133
II-16	$NHCH_3$	CH_3	$C(CH_3)=NOCH_3$	CH_3	WO-A 97/15552
II-17	$NHCH_3$	CH_3	$C(CH_3)=NOCH_2CH_3$	CH_2CH_3	WO-A 97/15552
II-18	$NHCH_3$	CH_3	$C(CH_3)=NOCH(CH_3)_2$	$CH(CH_3)_2$	WO-A 97/15552
II-19	$NHCH_3$	CH_3	$C(CH_3)=NO(c\text{-}C_3H_5)$	$c\text{-}C_3H_5$	WO-A 97/15552
II-20	$NHCH_3$	CH_3	$C(CH_3)=NOCH_2CH=CH_2$	$CH_2CH=CH_2$	WO-A 97/15552
II-21	$NHCH_3$	CF_3	$C(CF_3)=NOCH_3$	CH_3	WO-A 97/15552
II-22	$NHCH_3$	CF_3	$C(CF_3)=NOCH_2CH_3$	CH_2CH_3	WO-A 97/15552
II-23	$NHCH_3$	CF_3	$C(CF_3)=NOCH(CH_3)_2$	$CH(CH_3)_2$	WO-A 97/15552
II-24	$NHCH_3$	CF_3	$C(CF_3)=NO(c\text{-}C_3H_5)$	$c\text{-}C_3H_5$	WO-A 97/15552
II-25	$NHCH_3$	CF_3	$C(CF_3)=NOCH_2CH=CH_2$	$CH_2CH=CH_2$	WO-A 97/15552
II-26	OCH_3	CH_3	$C(CH_3)=NOCH_3$	CH_3	WO-A 97/15552
II-27	OCH_3	CH_3	$C(CH_3)=NOCH_2CH_3$	CH_2CH_3	WO-A 97/15552
II-28	OCH_3	CH_3	$C(CH_3)=NOCH(CH_3)_2$	$CH(CH_3)_2$	WO-A 97/15552
II-29	OCH_3	CH_3	$C(CH_3)=NO(c\text{-}C_3H_5)$	$c\text{-}C_3H_5$	WO-A

					97/15552
II-30	OCH_3	CH_3	$C(CH_3)=NOCH_2CH=CH_2$	$CH_2CH=CH_2$	WO-A 97/15552
II-31	OCH_3	CF_3	$C(CF_3)=NOCH_3$	CH_3	WO-A 97/15552
II-32	OCH_3	CF_3	$C(CF_3)=NOCH_2CH_3$	CH_2CH_3	WO-A 97/15552
II-33	OCH_3	CF_3	$C(CF_3)=NOCH(CH_3)_2$	$CH(CH_3)_2$	WO-A 97/15552
II-34	OCH_3	CF_3	$C(CF_3)=NO(c\text{-}C_3H_5)$	$c\text{-}C_3H_5$	WO-A 97/15552
II-35	OCH_3	CF_3	$C(CF_3)=NOCH_2CH=CH_2$	$CH_2CH=CH_2$	WO-A 97/15552

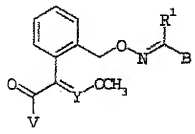
Table III



IV

No.	V	Y	T	R^a	Reference
III-1	OCH_3	CH	N	2-OCH_3, 6-CF_3	WO-A 96/16047
III-2	OCH_3	CH	N	2-$OCH(CH_3)_2$, 6-CF_3	WO-A 96/16047
III-3	OCH_3	CH	CH	5-CF_3	EP-A 278 595
III-4	OCH_3	CH	CH	6-CF_3	EP-A 278 595
III-5	$NHCH_3$	N	CH	3-Cl	EP-A 398 692
III-6	$NHCH_3$	N	CH	3-CF_3	EP-A 398 692
III-7	$NHCH_3$	N	CH	3-CF_3, 5-Cl	EP-A 398 692
III-8	$NHCH_3$	N	CH	3-Cl, 5-CF_3	EP-A 398 692

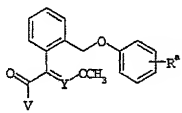
Table IV



V

No.	V	Y	R^1	B	Reference
IV-1	OCH_3	CH	CH_3	$(3\text{-}CF_3)C_6H_4$	EP-A 370 629
IV-2	OCH_3	CH	CH_3	$(3,5\text{-}Cl_2)C_6H_3$	EP-A 370 629
IV-3	$NHCH_3$	N	CH_3	$(3\text{-}CF_3)C_6H_4$	WO-A 92/13830
IV-4	$NHCH_3$	N	CH_3	$(3\text{-}OCF_3)C_6H_4$	WO-A 92/13830
IV-5	OCH_3	N	CH_3	$(3\text{-}OCF_3)C_6H_4$	EP-A 460 575
IV-6	OCH_3	N	CH_3	$(3\text{-}CF_3)C_6H_4$	EP-A 460 575
IV-7	OCH_3	N	CH_3	$(3,4\text{-}Cl_2)C_6H_3$	EP-A 460 575
IV-8	OCH_3	N	CH_3	$(3,5\text{-}Cl_2)C_6H_3$	EP-A 463 488

Table V

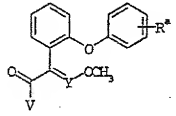


VI

No.	V	Y	R^a	Reference
V-1	OCH_3	N	$2\text{-}CH_3$	EP-A 253 213
V-2	OCH_3	N	$2,5\text{-}(CH_3)_2$	EP-A 253 213
V-3	$NHCH_3$	N	$2,5\text{-}(CH_3)_2$	EP-A 477 631
V-4	$NHCH_3$	N	2-Cl	EP-A 477 631
V-5	$NHCH_3$	N	$2\text{-}CH_3$	EP-A 477 631
V-6	$NHCH_3$	N	$2\text{-}CH_3$, $4\text{-}OCF_3$	EP-A 628 540
V-7	$NHCH_3$	N	2-Cl, $4\text{-}OCF_3$	EP-A 628 540
V-8	$NHCH_3$	N	$2\text{-}CH_3$, $4\text{-}OCH(CH_3)\text{-}C(CH_3)\text{=}NOCH_3$	EP-A 11 18 609
V-9	$NHCH_3$	N	2-Cl, $4\text{-}OCH(CH_3)\text{-}C(CH_3)\text{=}NOCH_3$	EP-A 11 18 609
V-10	$NHCH_3$	N	$2\text{-}CH_3$, $4\text{-}OCH(CH_3)\text{-}C(CH_2CH_3)\text{=}NOCH_3$	EP-A 11 18 609

V-11	$NHCH_3$	N	2-Cl,4-$OCH(CH_3)$-$C(CH_3)=NOCH_2CH_3$	EP-A 11 18 609

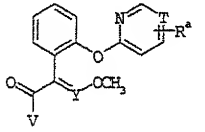
Table VI



VII

No.	V	Y	R^a	Reference
VI-1	$NHCH_3$	N	H	EP-A 398 692
VI-2	$NHCH_3$	N	3-CH_3	EP-A 398 692
VI-3	$NHCH_3$	N	2-NO_2	EP-A 398 692
VI-4	$NHCH_3$	N	4-NO_2	EP-A 398 692
VI-5	$NHCH_3$	N	4-Cl	EP-A 398 692
VI-6	$NHCH_3$	N	4-Br	EP-A 398 692

Table VII



VIII

No.	V	Y	T	R^a	Reference
VII-1	OCH_3	CH	N	6-O-(2-CN-C_6H_4)	EP-A 382 375
VII-2	OCH_3	CH	N	6-O-(2-Cl-C_6H_4)	EP-A 382 375
VII-3	OCH_3	CH	N	6-O-(2-CH_3-C_6H_4)	EP-A 382 375
VII-4	$NHCH_3$	N	N	6-O-(2-Cl-C_6H_4)	GB-A 22 53 624
VII-5	$NHCH_3$	N	N	6-O-(2,4-Cl_2-C_6H_3)	GB-A 22 53 624
VII-6	$NHCH_3$	N	N	6-O-(2-CH_3-C_6H_4)	GB-A 22 53 624
VII-7	$NHCH_3$	N	N	6-O-(2-CH_3,3-Cl-C_6H_3)	GB-A 22 53 624
VII-8	$NHCH_3$	N	N	2-F, 6-O-(2-CH_3-C_6H_4)	WO-A 98/21189

VII-9	$NHCH_3$	N	N	2-F, 6-O-(2-Cl-C_6H_4)	WO-A 98/21189
VII-10	$NHCH_3$	N	N	2-F, 6-O-(2-CH_3,3-Cl-C_6H_3)	WO-A 98/21189

Glyphosate derivatives II are essentially understood as meaning the following compounds, which are mentioned in The Pesticide Manual: for example, glyphosate may be employed as the free acid or in the form of salts such as the isopropylammonium salt, the sodium salt, the ammonium salt or the trimesium (trimethylsulfenium) salt. Mixtures of the salts may also be employed. Moreover, the glyphosate derivatives II include the compound N-(phosphonomethyl)glycine. The preparation of the glyphosate derivatives II can be found in the literature cited in The Pesticide Manual.

The compounds I in combination with glyphosate derivatives raise the yield potential in legumes. They are especially important for the treatment of various glyphosate-resistant crop plants such as soybeans, peas, beans, lentils, peanuts, lupins, and the seeds of these plants. The synergistic effect is demonstrated independently of the generation of the glyphosate-resistant legumes.

Specifically, they are suitable for controlling the following symptoms:

- signs of wilting despite the availability of sufficient nutrients,

- discolorations of the green leaf tissue such as, for example bleaching of soybeans.

The compounds I are applied by treating the plants to be protected or the seed with an effective amount of the active ingredients. Application can be effected both before and after application of the glyphosate derivatives II to the plants or seeds.

In a preferred embodiment of the method, the treatment of the plant is effected jointly with the application of the fungicide I and the herbicide II. The synergistic effect is particularly pronounced in this case.

When using a sublethal dose, the application rates are in the range of from 0.01 and 2.0 kg of active ingredient (acid

equivalent) per hectare, depending on the weather conditions and the plant species.

When using a lethal dose, the application rates are in the range of from 0.1 and 6.0 kg of active ingredient (acid equivalent) per hectare, depending on the weather conditions and the plant species.

In the treatment of seed, amounts of from 0.001 to 0.1 g, preferably 0.01 to 0.05 g of active ingredient are generally required per kilogram of seed.

The compounds I and the glyphosate derivatives II may be converted into the formulations conventionally used for crop protection products, for example solutions, emulsions, suspensions, dusts, powders, pastes and granules. The use form depends on the application in question; in any case, it should ensure uniform and even distribution of the compound according to the invention.

The formulations are prepared in the known manner, for example by extending the active ingredient with solvents and/or carriers, if desired using emulsifiers and dispersants, it also being possible to use other organic solvents as cosolvents if water is used as the diluent. Auxiliaries are essentially those also conventionally used for fungicides.

In general, the formulations comprise between 0.01 and 95% by weight, preferably between 0.1 and 90% by weight, of the active ingredient. The active ingredients are employed in a purity of from 90% to 100%, preferably 95% to 100% (according to NMR spectrum).

Examples of formulations are known from the publications cited at the outset.

Aqueous use forms can usually be prepared from emulsion concentrates, pastes or wettable powders (sprayable powders, oil dispersions) by addition of water. To prepare emulsions, pastes or oil dispersions, the substances, as such or dissolved in an oil or solvent, may be homogenized in water by means of wetter, sticker, dispersant or emulsifier. Alternatively, it is possible to prepare concentrates consisting of active substance, wetter, sticker, dispersant or emulsifier and, if appropriate, solvent or oil, and such

concentrates are suitable for dilution with water.

The active ingredient concentrations in the ready-to-use products may be varied within substantial ranges. In general, they are between 0.0001 and 10%, preferably between 0.01 and 1%.

The active ingredients may also be used successfully by the ultra-low-volume (ULV) method, it being possible to apply formulations comprising more than 95% by weight of active ingredient, or indeed the active ingredient without additions.

Various types of oils or herbicides, other fungicides, other pesticides or bactericides may be added to the active ingredients, if appropriate just prior to use (tank mix). These agents can be admixed with the compositions according to the invention in a weight ratio of from 1:10 to 10:1.

Mention of the use according to the invention of the active ingredients I may be made in the form of an imprint on the packaging or else in product data sheets. Such mention may also be made in the case of products which can be used in combination with the active ingredients I.

Use examples for the increased yield in legumes

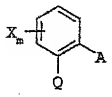
The active ingredients were used separately or together for preparing a 10% emulsion in a mixture of 85% by weight of cyclohexanone, 5% by weight of Nekanil® LN (Lutensol® AP6, wetter with emulsifying and dispersant action based on ethoxylated alkylphenols) and 10% by weight of Wettol® EM (nonionic emulsifier based on ethoxylated castor oil) and diluted with water to give the desired concentration.

Method for increasing the yield in legumes

Abstract

Method for increasing the yield in glyphosate-resistant legumes, which comprises treating the plants or the seed with a mixture comprising

a) a compound of the formula I



I

where
X, m, Q, A have the meaning given in the description and

b) a glyphosate derivative II

in a synergistically active amount.